

## Sample Syllabus for Chem 352

### Chemistry 352 – Inorganic Chemistry IIA

#### Course Description.

Chemistry 352 extends the concepts introduced in Chem 351 to explain increasingly complex chemical behavior, especially the reactivity of transition metal elements. Ligand substitution and redox reactivity of coordination complexes will be described from a mechanistic perspective. Chemical bonding and reactivity at the interface of inorganic and organic chemistry (i.e. organometallic chemistry) will be introduced. The relationship of these topics to applications of inorganic chemistry will be described.

**Prerequisites:** 01:160:351

#### Learning Outcomes.

- 1) Students should be able to relate periodic trends in the atomic properties of elements to periodic trends in the chemical behavior of elements and their compounds.
- 2) Students should be familiar with the mechanisms of ligand substitution at octahedral and square planar metal complexes, including the ability to analyze how the electronic configuration of the metal and identity of entering, leaving, and spectator ligands influence reaction pathways and rates.
- 3) Students should be familiar with the inner- and outer- sphere mechanisms for electron transfer.
- 4) Students should be familiar with common ligands in organometallic chemistry and how the electron count of the metal influences the stability of organometallic complexes.
- 5) Students should be able to identify common reaction types in organometallic chemistry and their relationship to catalytic reactivity.
- 6) Students should be familiar with important homogeneous and heterogeneous catalytic processes and their applications in research and industrial chemical synthesis.

#### Textbook and Resources.

"Inorganic Chemistry" by Shriver, Weller, Overton, Rourke, and Armstrong; Sixth Edition. W. H. Freeman (US) or Oxford Univ. Press (UK); ISBN-10: 1429299061; ISBN-13: 9780198757177

Online resources: <http://global.oup.com/uk/orc/chemistry/ichem6e/>

Other References: Lecture notes will be posted to the course site on Canvas. Lectures will mostly follow the material in the textbook, but some additional concepts, examples, and exercises will be included in the lectures. Likewise, quizzes and exams will primarily correspond to material covered in the textbook, but some problems may be derived from material that is covered only in lectures.

#### Grading.

A total of 250 points are possible\* and distributed as follows:

Quizzes (2 total): 50 pts (25 pts each)

Exams (2 total): 200 pts (100 pts each)

\* Final Letter grades will be assigned based on the point total accumulated in all assignments as follows:

GRADE	A	B+	B	C+	C	D	F
POINTS	250-225	224-213	212-200	199-188	187-175	174-150	≤149

## Sample Syllabus for Chem 352

### Course Policies

**Lecture Attendance:** Students are expected to attend all classes; if you expect to miss one or two classes, please use the University absence reporting website <https://sims.rutgers.edu/ssra/> to indicate the date and reason for your absence. An email is automatically sent to the instructor.

**Quizzes and Examinations:** There will be two in-class midterm exams and one final exam. Students should arrive on time to take the exams. A student who arrives late will not be allowed to take the exam if any other student has completed his/her exam and left the classroom. No additional time will be given to a student who arrives late. Exams will be supplemented with short quizzes that will be announced ~1 week prior to the quiz. Policies for quizzes are analogous to those for exams. If a student fails to take any of the exams or quizzes for a valid *documented-in-writing medical/emergency reason*, that exam or quiz will be dropped from consideration of the final course grade. The remaining exam + quiz grades will be scaled appropriately to arrive at the final grade out of 500 pts. The instructor should be notified as soon as possible if an exam will be missed and the student must use the University absence reporting website <https://sims.rutgers.edu/ssra/> within a week of the exam to indicate the date and reason for the absence.

**Homework:** Practice problems will be suggested but not collected or graded.

**Withdrawal Policy and T Grade Policy:** The administration of Chem 352 will adhere strictly to the academic regulations stipulated in the most recent Schedule of Classes and the RU General Catalog. Students, who wish to withdraw from the course must follow [RU course withdrawal policies](#). Students are required to complete all courses for which they are registered by the end of the semester. For Chem 352, a student, who misses  $\geq 100$  pts worth of exams and quizzes for a valid reason or is unable to complete his or her work due to a verifiable emergency situation will receive a temporary T grade. Missed course work will be made up by oral examination or by taking corresponding exams in the next semester of Chem 352. Students receiving a T grade are required to contact the instructor for an interpretation of the T grade and to establish a timetable for the completion of coursework.

### Academic Integrity

**Honor pledge:** Students need to sign the Rutgers Honor Pledge on every major exam assignment as follows: *On my honor, I have neither received nor given any unauthorized assistance on this examination (assignment).*

**Promoting a culture of academic integrity:** Rutgers University takes academic dishonesty very seriously. By enrolling in this course, you assume responsibility for familiarizing yourself with the Academic Integrity Policy and the possible penalties (including suspension and expulsion) for violating the policy.

Please review the [Academic Integrity Policy](#)

As per the policy, all suspected violations will be reported to the Office of Student Conduct. Academic dishonesty includes (but is not limited to):

- Cheating
- Plagiarism
- Aiding others in committing a violation or allowing others to use your work
- Failure to cite sources correctly
- Fabrication

## Sample Syllabus for Chem 352

- Using another person's ideas or words without attribution—re-using a previous assignment
- Unauthorized collaboration
- Sabotaging another student's work in doubt, please consult the instructor

Reporting infractions of the honor code is both your responsibility and the instructors. Use of external website resources such as Chegg.com or others to obtain solutions to homework assignments, quizzes, or exams is cheating and a violation of the University Academic Integrity policy. Cheating in the course may result in grade penalties, disciplinary sanctions or educational sanctions. Posting homework assignments, or exams, to external sites without the instructor's permission may be a violation of copyright and may constitute the facilitation of dishonesty, which may result in the same penalties as plain cheating.

**Protecting the intellectual property of students and instructors:** Almost all original work is the intellectual property of its authors. These works may include syllabi, lecture slides, recorded lectures, homework problems, exams, and other materials, in either printed or electronic form. The authors may hold copyrights in these works, which are protected by U.S. statutes. Copying this work or posting it online without the permission of the author may violate the author's rights. More importantly, these works are the product of the author's efforts; respect for these efforts and for the author's intellectual property rights is an important value that members of the university community take seriously.

For more instructions on copyright protections at Rutgers University, please refer to the [Rutgers Libraries](#).

### Student-Wellness Services

**Counseling, ADAP & Psychiatric Services (CAPS):** (848) 932-7884 / 17 Senior Street, New Brunswick, NJ 08901 / <http://health.rutgers.edu/medical-counseling-services/counseling/>

CAPS is a University mental health support service that includes counseling, alcohol and other drug assistance, and psychiatric services staffed by a team of professionals within Rutgers Health services to support students' efforts to succeed at Rutgers University. CAPS offers a variety of services that include: individual therapy, group therapy and workshops, crisis intervention, referral to specialists in the community, and consultation and collaboration with campus partners.

**Crisis Intervention:**

<http://health.rutgers.edu/medical-counseling-services/counseling/crisis-intervention/>

**Report a Concern:** <http://health.rutgers.edu/do-something-to-help/>

**Violence Prevention & Victim Assistance (VPVA):** (848) 932-1181 / 3 Bartlett Street, New Brunswick, NJ 08901 / [www.vpva.rutgers.edu/](http://www.vpva.rutgers.edu/)

The Office for Violence Prevention and Victim Assistance provides confidential crisis intervention, counseling and advocacy for victims of sexual and relationship violence and stalking to students, staff and faculty. To reach staff during office hours when the university is open or to reach an advocate after hours, call 848-932-1181.

**Disability Services:** (848) 445-6800 / Lucy Stone Hall, Suite A145, Livingston Campus, 54 Joyce Kilmer Avenue, Piscataway, NJ 08854 / <https://ods.rutgers.edu/>

Rutgers University welcomes students with disabilities into all of the University's educational programs. In order to receive consideration for reasonable accommodations, a student with a disability must contact the appropriate disability services office at the campus where you are officially enrolled, participate in an intake interview, and provide documentation: <https://ods.rutgers.edu/students/documentation-guidelines>. If the documentation supports your request for reasonable accommodations, your campus's

## Sample Syllabus for Chem 352

disability services office will provide you with a Letter of Accommodations. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. To begin this process, please complete the Registration form on the ODS web site at: <https://ods.rutgers.edu/students/registration-form>.

### Schedule of Lectures and Exams

Class #	Topics	Chapter Sections/Reading
1	Periodic Trends: Elements	9.1 – 9.5
2	Periodic Trends: Compounds	9.6 – 9.10
3	Ligand Substitution in Square Planar Complexes	21.1 – 21.4
4	Ligand Substitution in Octahedral Complexes	21.5 – 21.9
5	Mechanisms of Redox Processes	21.10 – 21.15
6	Introduction to Organometallic Chemistry	22.1 – 22.6
7	<b>Exam 1</b>	<b>Lectures 1 – 6</b>
8	Ligands in Organometallic Chemistry	22.7 – 22.17
9	Organometallic Compounds	22.18 – 22.20
10	Organometallic Reactivity and catalysis	22.21 – 22.26, 25.1, 25.2
11	Homogeneous Catalysis	25.3 – 25.9
12	Heterogeneous Catalysis	25.10 – 25.17
13	Immobilized Catalysts	25.18 – 25.20
14	<b>Exam 2</b>	<b>Lecture 8 – 13</b>